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Tin particle size measurements in high explosively driven shock-wave experiments using Mie scattering method SHABNAM MONFARED, WILLIAM BUTTLER, MARTIN SCHAUER, Los Alamos National Laboratory, BRANDON LALONE, Special Technologies Laboratory, CORA PACK, Los Alamos National Laboratory, GERALD STEVENS, Special Technologies Laboratory, JOSEPH STONE, Los Alamos National Laboratory, LOS ALAMOS NATIONAL LABORATORY TEAM, SPECIAL TECHNOLOGIES LABORATORY COLLABORATION — Los Alamos National Laboratory is actively engaged in the study of material failure physics to support the hydrodynamic models development, where an important failure mechanism of explosively shocked metals causes mass ejection from the backside of a shocked surface with surface perturbations. Ejecta models are in development for this situation. Our past work has clearly shown that the total ejected mass and mass-velocity distribution sensitively link to the wavelength and amplitude of these perturbations. While we have had success developing ejecta mass and mass-velocity models, we need to better understand the size and size-velocity distributions of the ejected mass. To support size measurements we have developed a dynamic Mie scattering diagnostic based on a CW laser that permits measurement of the forward attenuation cross-section combined with a dynamic mass-density and mass-velocity distribution, as well as a measurement of the forward scattering cross-section at 12 angles (5- 32.5 degrees) in increments of 2.5 degrees. We compare size distribution followed from Beers law with attenuation cross-section and mass measurement to the dynamic size distribution determined from scattering cross-section alone. We report results from our first quality experiments.

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